

Attorney Docket No. 06618-891001
Application No. 10/064,500
Amendment dated April 22, 2004
Reply to Office Action dated January 23, 2004

Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently amended) A method comprising:

placing a first substrate with a first metal surface part that has better microwave absorption than said first substrate, against a second substrate with a second metal surface part that has better microwave absorption than said second substrate;

aligning said first surface part with said second surface part; and

applying microwave energy to the first and second surface parts to bond the first substrate to the second substrate.

2. (Currently amended) ~~A method as in claim 1,~~ A method comprising:

placing a first substrate with a first surface part that has better microwave absorption than said first substrate, against a second substrate with a second surface part that has better microwave absorption than said second substrate;

aligning said first surface part with said second surface part; and

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applying microwave energy to the first and second parts to bond the first substrate to the second substrate; and

wherein the first substrate is placed on top of the second substrate, and is held only by gravity during bonding.

3. (Currently amended) ~~A method as in claim 1;~~ A method comprising:

placing a first substrate with a first surface part that has better microwave absorption than said first substrate, against a second substrate with a second surface part that has better microwave absorption than said second substrate;

aligning said first surface part with said second surface part; and

applying microwave energy to the first and second parts to bond the first substrate to the second substrate; and

wherein said bonding includes hermetically sealing a cavity.

4. (Currently amended) A method as in claim 3, wherein said first and second surface parts each extend around a closed perimeter, and wherein said hermetically sealing comprises hermetically sealing along an entirety of said closed perimeter.

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5. (Original) A method as in claim 2, wherein said first and second surface parts are metals.

6. (Previously presented) A method as in claim 5, wherein said first substrate is poorly microwave absorbing silicon.

7. (Original) A method as in claim 1, wherein said first substrate has an outer surface part formed of a material with a high imaginary dielectric constant ϵ'' .

8. (Currently amended) A method, comprising:
forming a first substrate having a poorly microwave absorbing material at a first portion and a thin film of better absorbing metal material at a second portion;
forming a second substrate having a poorly microwave absorbing material, having a material at a first portion, and a thin film of better absorbing metal material at a second portion; and
using microwave energy to bond the thin films.

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9. (Currently amended) ~~A method as in claim 8,~~ A method,
comprising:

forming a first substrate having a poorly microwave
absorbing material at a first portion and a thin film of better
absorbing material at a second portion;

forming a second substrate having a poorly microwave
absorbing material, having a material at a first portion, and a
thin film of better absorbing material at a second portion; and

using microwave energy to bond the thin films; and

wherein said first substrate is held on the second
substrate by gravity only.

10. (Original) A method as in claim 9, wherein the first
substrate includes an indented portion therein, and said bonding
comprises hermetically sealing around a perimeter of the
indented portion.

11. (Original) A method, comprising:

placing a first substrate of a first material, having a
first area defined within a perimeter of a second material,
against a second substrate, of the third material, said second
substrate also having a second area defined within a perimeter
of a fourth material, and wherein said first and third materials

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are poorer absorbers of microwaves than said second and fourth materials; and

applying microwaves to an area of said first substrate and said second substrate to bond said second material to said fourth material.

12. (Original) A method as in claim 11, wherein said first and third materials are semiconductor materials.

13. (Original) A method as in claim 12, wherein said second and fourth materials are metal materials.

14. (Original) A method as in claim 11, wherein said second and fourth materials define a perimeter with a closed shape.

15. (Original) A method as in claim 14, further comprising forming a hermetically sealed cavity within said perimeter.

16. (Original) A method as in claim 11, wherein said placing comprises placing one of said substrates on the top of the other of said substrates.

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17. (Original) A method as in claim 16, wherein said one and said other substrates are held together only by gravity during said bonding.

18. (Original) A method as in claim 16, wherein said one and said other substrates are held together by an additional weight.

19. (Original) A method as in claim 13, wherein said second and fourth materials are gold.

20. (Original) A method as in claim 18, wherein said additional weight is sapphire.

21. (Currently amended) A device, comprising:

a first substrate of a material that is a poor absorber of microwaves, having a first surface that includes a metal that is a better absorber of microwaves;

a second substrate of a material that is a poor absorber of microwaves, having a second surface that includes a metal that is a better absorber of microwaves that is aligned with the first surface;

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said first and second surfaces, coupled together to define
an area of connection therebetween.

22. (Currently amended) ~~A device as in claim 21,~~ A device,
comprising:

a first substrate of a material that is a poor absorber of
microwaves, having a first surface that is a better absorber of
microwaves;

a second substrate of a material that is a poor absorber of
microwaves, having a second surface that is a better absorber of
microwaves that is aligned with the first surface;

said first and second surfaces, coupled together to define
an area of connection therebetween; and

wherein said material of said first substrate ~~are~~is
semiconductor material.

23. (Currently amended) ~~A device as in claim 21,~~ A device,
comprising:

a first substrate of a material that is a poor absorber of
microwaves, having a first surface that is a better absorber of
microwaves;

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a second substrate of a material that is a poor absorber of microwaves, having a second surface that is a better absorber of microwaves that is aligned with the first surface;

said first and second surfaces, coupled together to define an area of connection therebetween; and

wherein said first and second surfaces are metals.

24. (Currently amended) ~~A device as in claim 21,~~ A device, comprising:

a first substrate of a material that is a poor absorber of microwaves, having a first surface that is a better absorber of microwaves;

a second substrate of a material that is a poor absorber of microwaves, having a second surface that is a better absorber of microwaves that is aligned with the first surface;

said first and second surfaces, coupled together to define an area of connection therebetween; and

wherein said metal has a thickness within an order of magnitude of the skin depth of the first and second surfaces.

25. (Original) A device as in claim 21, wherein said area of connection forms a closed perimeter.

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26. (Currently amended) ~~A device as in claim 25,~~ A device,
comprising:

a first substrate of a material that is a poor absorber of
microwaves, having a first surface that is a better absorber of
microwaves;

a second substrate of a material that is a poor absorber of
microwaves, having a second surface that is a better absorber of
microwaves that is aligned with the first surface;

said first and second surfaces, coupled together to define
an area of connection therebetween;

wherein said metal has a thickness within an order of
magnitude of the skin depth of the first and second surfaces;

wherein said area of connection forms a closed perimeter;
and

wherein said closed perimeter defines a hermetically sealed
chamber.

27. (Original) A device as in claim 26, wherein said
hermetically sealed chamber holds a vacuum relative to the
surround environment.

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28. (Currently amended) A method, comprising:

bringing a first semiconductor substrate with a first metal film into contact with [[to]] a second semiconductor substrate with a second metal film, where both said first and second metal films are less than an order of magnitude thicker than the skin depth of the metal; and

applying microwaves to said first and second semiconductor substrates to bond said first metal film to said second metal film.

29. (Original) A method as in claim 28, wherein said applying microwaves comprise applying microwave in a cylindrical cavity which is excited by a microwave source at the resonant frequency of a TM₀₁₀ mode.

30. (Currently amended) A method as in claim 28, wherein said first and second metal films ~~formed~~ form one or more closed perimeters, and said applying microwaves carries out bonding of said first and second metal films in a way that forms a cavity within said first and second metal film.

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31. (Original) A method as in claim 30, wherein said applying microwaves comprise applying microwaves within a chamber, and further comprising forming a vacuum within said chamber, to form a vacuum within said cavity after bonding.

32. (Original) A method as in claim 28, wherein at least one of said first and second substrates include electronic components thereon.

33. (Currently amended) A method as in claim 32, further comprising shielding said ~~electrical~~ electronic components prior to said applying microwaves.

34. (Original) A method as in claim 28, further comprising placing a plurality of samples on a conveyor, and taking said samples into an area of microwave fields.

35. (Original) A method as in claim 16, wherein said placing includes aligning said first and second materials.